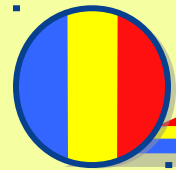


# **Guided Experiential Learning: Training Design and Evaluation**

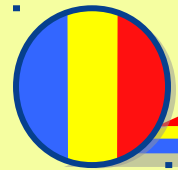
**Mike Faughnan**  
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**(DSN)680-4333**

**18 April 2006**



# Agenda

- **ADCSOPS&T Guidance**
- **New Army Learning Model**
- **Army Performance Improvement**
- **Foundations of GEL**
- **Components of Design Models**
- **Components of GEL Instruction**
- **Overview of GEL Design**
- **Using Guided Experience to Design Courses**
- **Job Aids**
- **Summary**



# ADCSOPS&T Guidance

- **(Mar 04) Update TD process**
  - **Go anywhere, get help from anyone, no sacred cows**
  - **Take about 2 years**
- **(Mar 05) Execute dL Contracts to Train TDers**
  - **Use Performance Improvement Center of Excellence to model dL process**
  - **Approved for start-up at ATSC in FY 05**



# New Army Learning Model

← —————  
-Guided Self-Development  
-Just-in-Time Learning  
-Live/Virtual/Constructive Exercises  
—————→

← ————— MTT, OJT, AOT —————→

Individual Learning Preparation

Collective Learning Synergy

Reinforcement

## Phase I: dL at TRADOC Schools

**Option to complete at home station. Most will complete Phase I at TRADOC.**

Knows: Common terms, facts, basic concepts, basic principles (entrance requirement)

Diagnostic Testing: Writing, reading, tactics, etc. (entrance requirement)

Common content: Common core & mandatory training (graduation requirement)

## Phase II: Classroom Instruction

### Blend of dL & f2f

- dL for nights, weekends, & planned weekday periods
- f2f maximizes integrated performance-based instruction (e.g. hands-on, CPX, FTX, cap



**-Shared challenging exercises build cohesion.**

## Phase III: Learning at Unit

### Graduation Requirement:

**Student responsibility to complete common content**

### Provide for Transfer

- Sustainment via dL (e.g. teach-back multi-media)

**Supervisor provides feedback for course improvement**



← ————— **Guided Experiential Learning (How to Instruct)** —————→

**TRADOC -- Victory Begins Here**



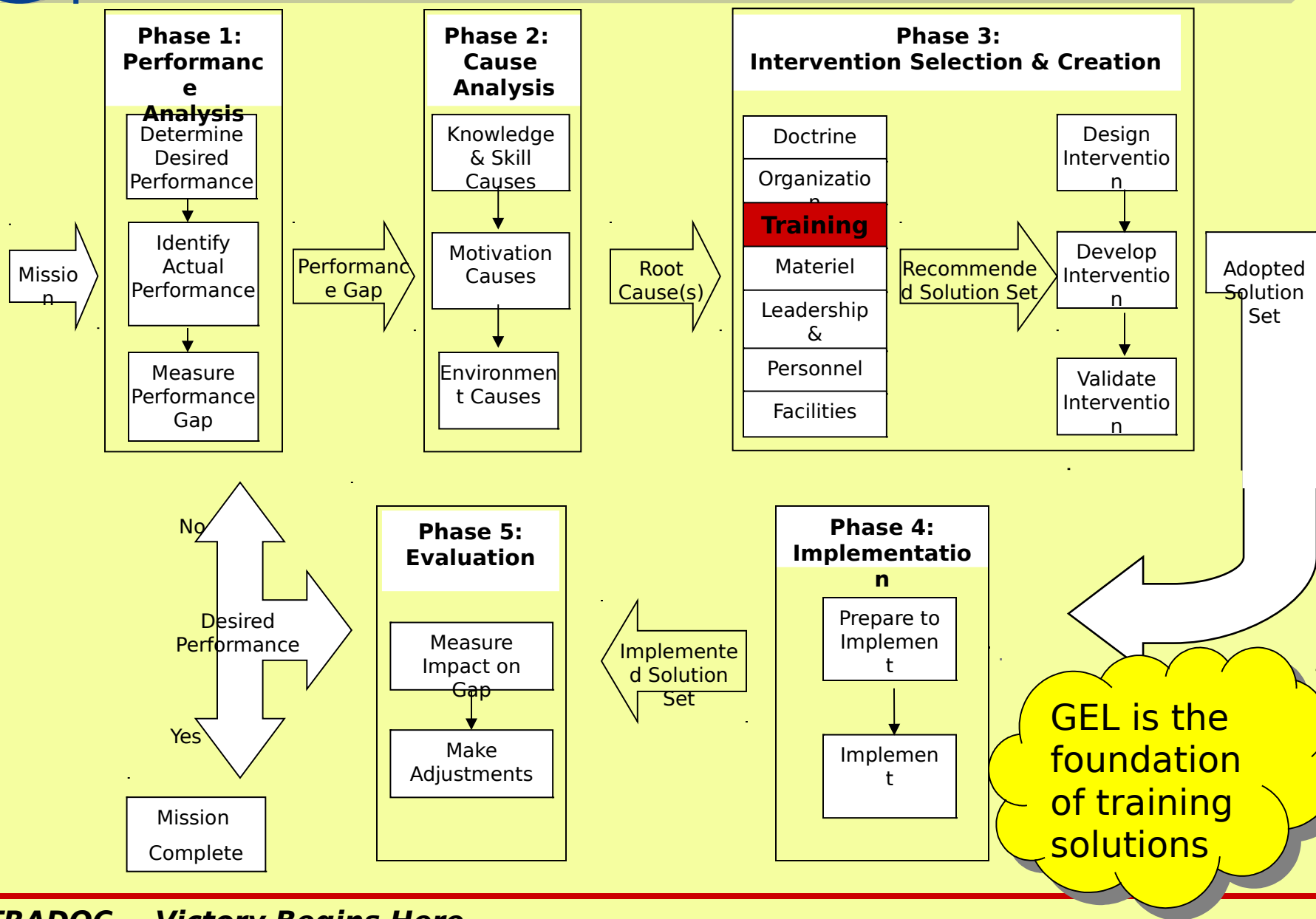
# **What is Army Performance Improvement?**

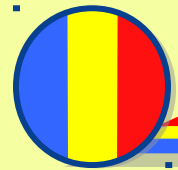
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- **Based on Human Performance improvement:**
- **Structured methodology to align TD mission with business goals:**
  - **seek and destroy impediments to efficient mission accomplishment**
  - **implement the correct interventions (DOTMLPF)**
  - **measure performance improvement rather than adherence to SAT process**



# Army Performance Improvement Process Diagram





# Three Foundations of GEL

- **Office of Naval Research Review of most effective pedagogical strategies for DL**  
*“What works in DL”* (2004) O’Neil (Ed.) Infoage.
- **Merrill’s “First Principles” review of best design models** (ETR&D, 2002, 50[2], 50-59)
- **Mayer and Reiser et al critiques of “Discovery Learning” and unguided problem-based learning** (Mayer, R, 2004; “Three Strikes Rule”, *American Psychologist*, 59(1)).

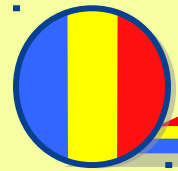


# **Merrill: Effective Components of Design Models**

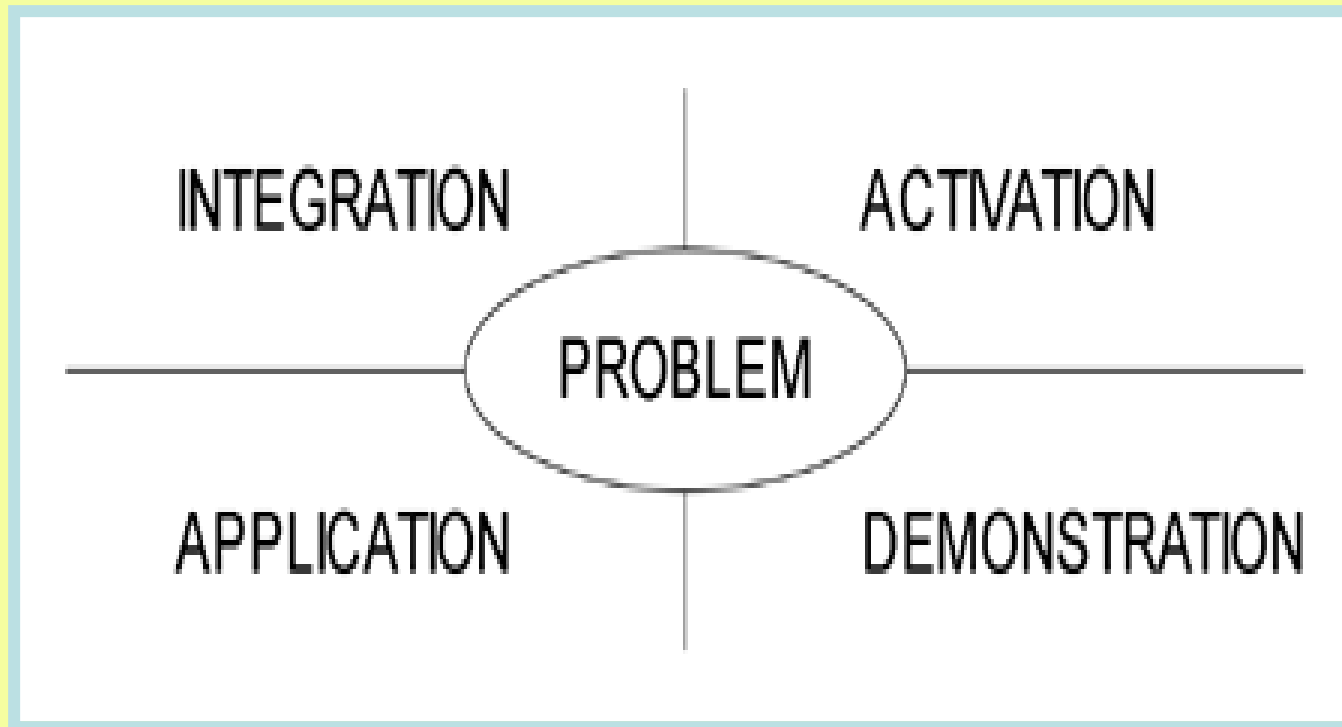
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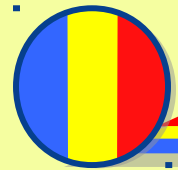
**Reviewed 30+ models and identified five components that were common to all effective models:**

- 1. Solve real problems from field**
- 2. Activate relevant prior knowledge**
- 3. Demonstrate how to solve**
- 4. Apply what is learned by solving**
- 5. Integrate learning so that it reflects real field conditions**



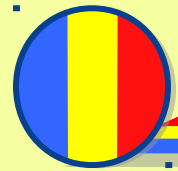
# Five Most Important Elements of Design Models



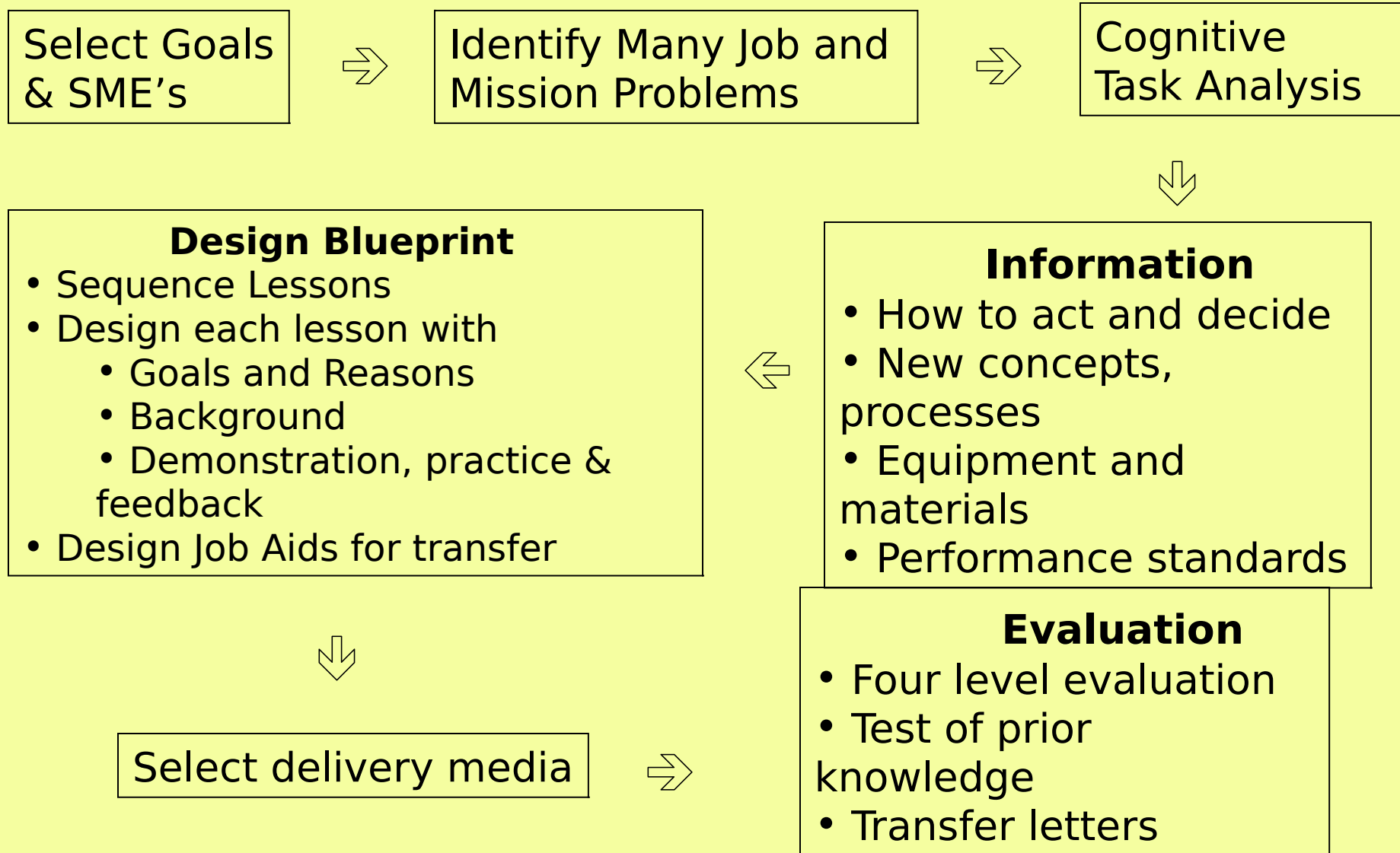


# Five Components of GEL Instruction

- 1. Goals (what trainees will be able to do)**
  - You will learn how to (REMEMBER, DO, APPLY...)
- 2. Reasons (Benefits and Risks)**
  - Value of learning - consequences of not learning
  - What you already know that you should use
- 3. Overview (What you need to know)**
  - Teach new concepts and processes needed to learn procedure
  - Give job aid's based on CTA procedure
- 4. Demonstration (of the procedure)**
  - Worked examples of problems using CTA procedure
  - Use integrated visuals and sound (narration)
  - Instructor or Model should be credible, similar
- 5. Practice and Feedback.**
  - First show easy problem and solution - ask for questions - do not focus on errors but on "correcting strategies"
  - Second, next easy problem and half of solution
    - Ask trainees to complete it for practice
    - Focus them on job aid for reminders
  - Third, give moderate problem and  $\frac{1}{4}$  solution
  - Fourth, moderate then complex and ask them to solve
  - Gradually fade support - training wheels come off!



# Overview of DL Design





# Using Guided Experience to Design Courses

Select Course  
& SME's



Identify Many Job and  
Mission Problems

Cognitive  
Task Analysis

## Problem Selection and Examples

- Identify goals and experience level of trainees
- Work with 2 experienced SME (beyond MOS)
- Identify six large, authentic field problems
  - From Easy to Moderate to Difficult
- Create “worked examples” of the problems
  - Use cognitive task analysis information
  - Starting conditions, procedure and output?
  - Solutions must be understood by trainees



# Using Guided Experience to Design Courses

Select Course  
& SME's



Identify Many Job and  
Mission Problems



Cognitive  
Task Analysis

## Cognitive task analysis

**Interview expert and ask:**

- **Outline tasks in order performed in field**
- **For each task:**
  - **What must happen for task to begin?**
  - **List actions and decisions for every team member**
  - **Capture new concepts and “how it works” processes**
  - **List necessary equipment/material**
  - **List performance standards (speed, accuracy)**
  - **Review analysis for accuracy and revise**



## Cognitive Task Analysis - Second SME

- Interview second SME and ask them
  - Can you suggest better problems?
  - Review for accuracy (Can it be done this way?)
  - Review for efficiency (Is there a quicker way?)
  - What has been forgotten?
- Repeat with third SME if possible
- Produce printed copy of all procedures for each task with related starting conditions, steps, equipment & standards

### Identify

- How to act and decide
- New concepts, processes
- Equipment and materials
- Performance standards



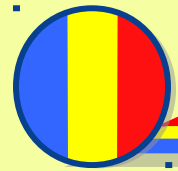
# Using Guided Experience to Design Courses

## Design Lessons

- **Sequence groups of problems/tasks into lessons**
  - **First performed in field are first taught**
  - **If no fixed sequence, easy before difficult**
- **Develop goals for each lesson**
  - **Remember concepts, processes**
  - **Remember conditions and consequences**
  - **Perform procedure in the field**
- **Design job aid's based on procedure**

### **Design**

- Sequence Lessons
- Design each lesson with
  - Goals and Reasons
  - Background
  - Demonstration, practice & feedback
- Design Job Aids for transfer



# Job Aids

- **Where possible, summarize all key procedures for trainees to use while learning**
- **Job aids are not “cheating” they are “training wheels” that help trainees during practice**
- **Remove the job aids as they succeed at practice**



# Using Guided Experience to Design Courses

Select delivery media

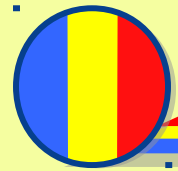


## Evaluation

- Four level evaluation
- Test of prior knowledge
- Transfer letters

## Media Selection, Evaluation and Transfer

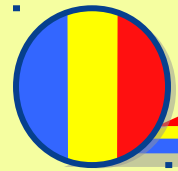
- Select media based on context, practice and cost
- Evaluate on four levels
  1. Reactions (motivation - confidence, value)
  2. Learning (use practice exercises to evaluate)
  3. Transfer (check with supervisor/commander)
  4. Impact (did it make a difference to bottom line?)
- Send letter to commander asking for transfer help



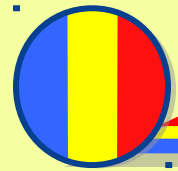
# Summary

**Despite more up front time and effort required for Guided Experiential Design and delivery:**

- **Amount learned increases**
- **Learning time decreases**
- **Learners like it as well as pure immersion**
- **Involves “authentic” settings and tasks**
- **Transfers to the field and reduces application errors**



- **Back up**

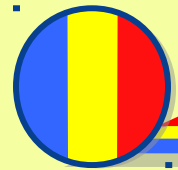


# **GEL vs Unguided & Features Tng**

## **Comparing GEL to Unguided learning**

**Three training groups (50 adults in each group)  
learning to use Excel Spreadsheet:**

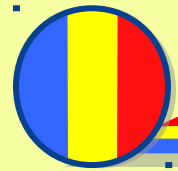
- 1. Unguided Experiential learning lesson**
- 2. Standard “features” training from Excel**
- 3. Guided Experience - Model we will discuss**



# Comparing GEL With Other Design Systems

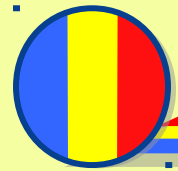
**Merrill's study of pure, guided and standard training  
to use excel spreadsheets**

	<b>Learning</b>	<b>Time</b>	<b>Satisfaction</b>
<b>Pure</b>	<b>34% 60 min+</b>		<b>High</b>
<b>Standard</b>	<b>68% 49 min</b>		<b>Low</b>
<b>Guided</b>	<b>89% 29 min</b>		<b>High</b>



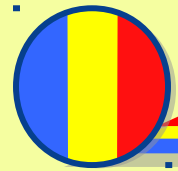
# Four Training Misconceptions

- 1. Use of Multimedia and Games increase learning and motivation**
  - Training methods influence learning, NOT media
  - Motivation caused by beliefs NOT media
  
- 2. SME's give accurate information that is useful to trainees**
  - SME's describe "what" not "how"
  - Leave out about 80 percent of "decisions"

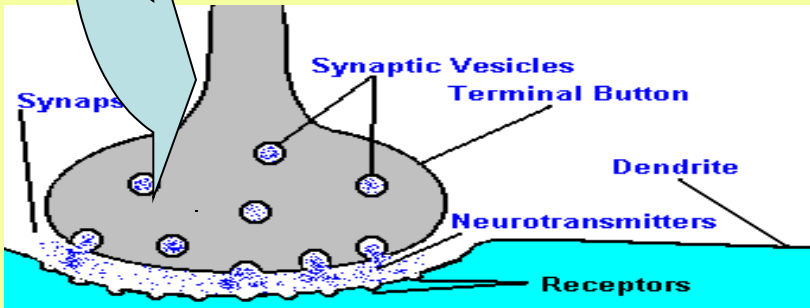
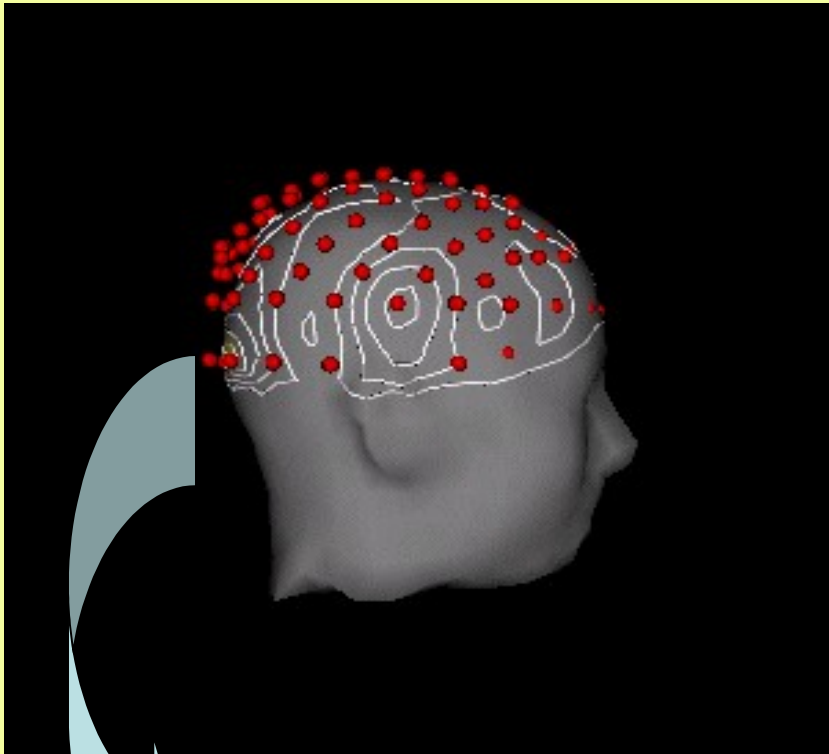


# Four Training Misconceptions

- 3. Behavioral task analysis will capture the way experts make decisions and solve problems**
  - Cognitive task analysis captures complex decision-making knowledge of all types
  - Can be used to provide complete learning guidance
- 4. Learning Styles help us shape different training for different trainees**
  - Meyer's Briggs and visual/verbal learner measures do not work
  - Only trainees with different levels of prior knowledge and motivation need different types of instruction

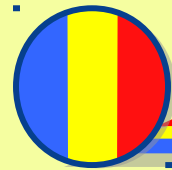


# Mental Architecture for Learning



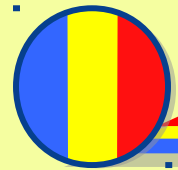
The mind is structured to protect existing knowledge and to learn new information.

Training must overcome the protective devices and support mental strategies that aid learning



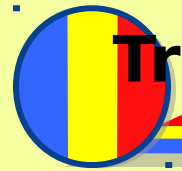
# Mental architecture influences on learning

- 1. We have a very limited thinking space, easily overloaded to protect us from scrambling our brain ( ONLY 3 +/- 2 “chunks”/or ideas at one time)**
  - When overloaded, our brain “short circuits” and stops learning
  - Overload is not noticed - may be enjoyable
  - To overcome this limit we have two different but interacting knowledge systems
- 2. Two types of knowledge systems compensate for limited “thinking” space**
  - A) Declarative (What and Why)**
    - Conscious, easily learned and changed, can be wrong - designed to handle novelty, uncertainty
  - B) Procedural (When and How)**
    - Unconscious, difficult to learn and change, can't be wrong - designed to circumvent limits on consciousness



# Mental Architecture

3. Once we accept a new goal, our “learning system” architecture is structured to select and/or develop a procedure for achieving it.
  - General learning procedures include:
    - Plans to achieve the goal
    - Connections to relevant prior knowledge,
    - Ways to select the important and ignore the rest
    - Self monitoring for accuracy and results feedback
    - Procedures for using feedback to tune the plan
4. Successful training provides clear goals and supports the learning strategies that trainees can't or won't provide for themselves.
  - Provide a clear “3C” goal (concrete, current, challenging),
  - Motivate them to accept and persist at achieving it
  - Show how with “worked example” including decisions
  - Immerse in a variety of realistic examples - starting simple and gradually becoming realistic
  - Support their learning strategies as they develop their own version of a procedure



# Training Design Reflecting Mental Architecture

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- **Cognitive Task Analysis gives accurate and complete information on all actions and decisions needed**
- **Complete information must be embedded in learning plans with demonstrations, practice and feedback**
- **Think of immersive simulations and games as a basis for demonstrations and practice of skills until they automate**